## Letters to the Editor

High Upper Yield Points in Mild Steel, *by M. W. Hutchison* 431

Calculation of the Liquidus Temperature of Blast-furnace Slags, *by J. M. Ridgion* 432

## Iron and Steel Institute Papers

Microhardness Penetration Curves in Two Nickel-bearing Carburized Steels, *by H. W. Otte* 13

Effect of Alloying Elements on the High-Temperature Tensile Strength of Normalized Low-carbon Steel, *by J. Glen* 21

The Physical Metallurgy of Low-carbon, Low-alloy Steels containing Boron, *by K. J. Irvine, F. B. Pickering, W. C. Heselwood, and W. Atkins* 54

A High-temperature X-ray Study on High-speed Steel, *by H. J. Goldschmidt*

Part I—The Lattice Expansion of Matrix and Carbide 68

Part II—Transformations during Tempering and Some Considerations on Martensite-type Reactions 79

Surface Tension of Pure Liquid Iron, Cobalt, and Nickel at 1550°C, *by P. Kozakevitch and G. Urbain* 167

Correlation of Tensile Properties with Microstructure for Some 3% Nickel Steels, *by J. P. Hugo and J. H. Woodhead* 174

The Effect of Cold Work on the Creep-Rupture Properties of a Series of Simple 18–8 Type Stainless Steels, *by F. B. Cuff, jun., and N. J. Grant* 188

Oxygen Lancing of Pig Iron and Subsequent Fume Treatment with a Pease-Anthony Venturi Scrubber *by P. K. Gledhill, P. J. Carnall, and K. H. Sargent* 198

The Nature of Mechanically Polished Metal Surfaces, *by L. E. Samuels and G. R. Wallwork* 211

A Contribution to the Study of the Anomalies in the Internal Friction of Iron due to the Presence of Nitrogen in Solution, *by L. Guillet and P. Gence* 223

Friction in Cold Rolling, *by G. T. van Rooyen and W. A. Backofen* 235

Tonnage Oxygen. The Field of Application in Steelmaking, *by F. J. Clark and J. L. Harrison* 305

A Study of Temper-Brittleness in Cr–Mn Steel containing Large Amounts of Molybdenum, Tungsten, and Vanadium, *by A. E. Powers* 323

Stress Corrosion of Austenitic Stainless Steels in Steam and Hot-Water Systems, *by C. Edeleanu and P. P. Snowden* 406

The Precipitation of ε-carbide by Ageing of Soft Steel, *by N. Hansen and E. W. Langer* 422

A Note on the Transformation of Austenitic Manganese Steel, *by A. E. W. Smith* 425

## British Iron and Steel Research Association

The Chlorine Method for the Determination of Non-metallic Inclusions in Steel, *by C. W. Short, R. S. Roberts, and G. Croall* 85

The Cooling of Hot Steel Strip with Water Jets, *by A. Sigalla* 90

A Width Meter for Hot Steel Strip, *by C. Burns and B. O. Smith* 218

Influence of Slag Properties on Pig-iron Composition, *by A. J. Burgess and B. G. Baldwin* 227

A Thermodynamic Study of $FeO$–$Fe_2O_3$–$SiO_2$, $FeO$–$Fe_2O_3$–$P_2O_5$, and $FeO$–$Fe_2O_3$–$SiO_2$–$P_2O_5$ Molten Systems, *by E. T. Turkdogan, and Patricia M. Bills* 329

The Liquidus and High-temperature Properties of Blast-furnace Slags, *by B. G. Baldwin* 388

Heat Flow in Ingot Hot-tops, *by G. Fenton* 396

## Iron and Steelworks Engineering

*Discussion at Thirty-first Meeting*

The Conversion of a High-lift Slabbing Mill to a Universal Mill 110

*Discussion at Thirty-second Meeting*

Blowers for Use in Iron and Steelworks 259

News 113, 267, 353, 436

Translations 116, 270, 355, 438

Abstracts 117, 271, 356, 439

Book Notices 150, 302, 383, 463

New Publications 152, 304, 384, 464

# *ABBREVIATIONS AND SYMBOLS*

Beginning with the January, 1956, issue, the recommendations of British Standard 1991: Part 1: 1954 (Letter symbols, signs and abbreviations) have been adopted for use in the *Journal*. The following list gives the preferred symbol or abbreviation where the Standard offers alternatives, and certain abbreviations that are not covered in the Standard but which are approved for use in the *Journal*.

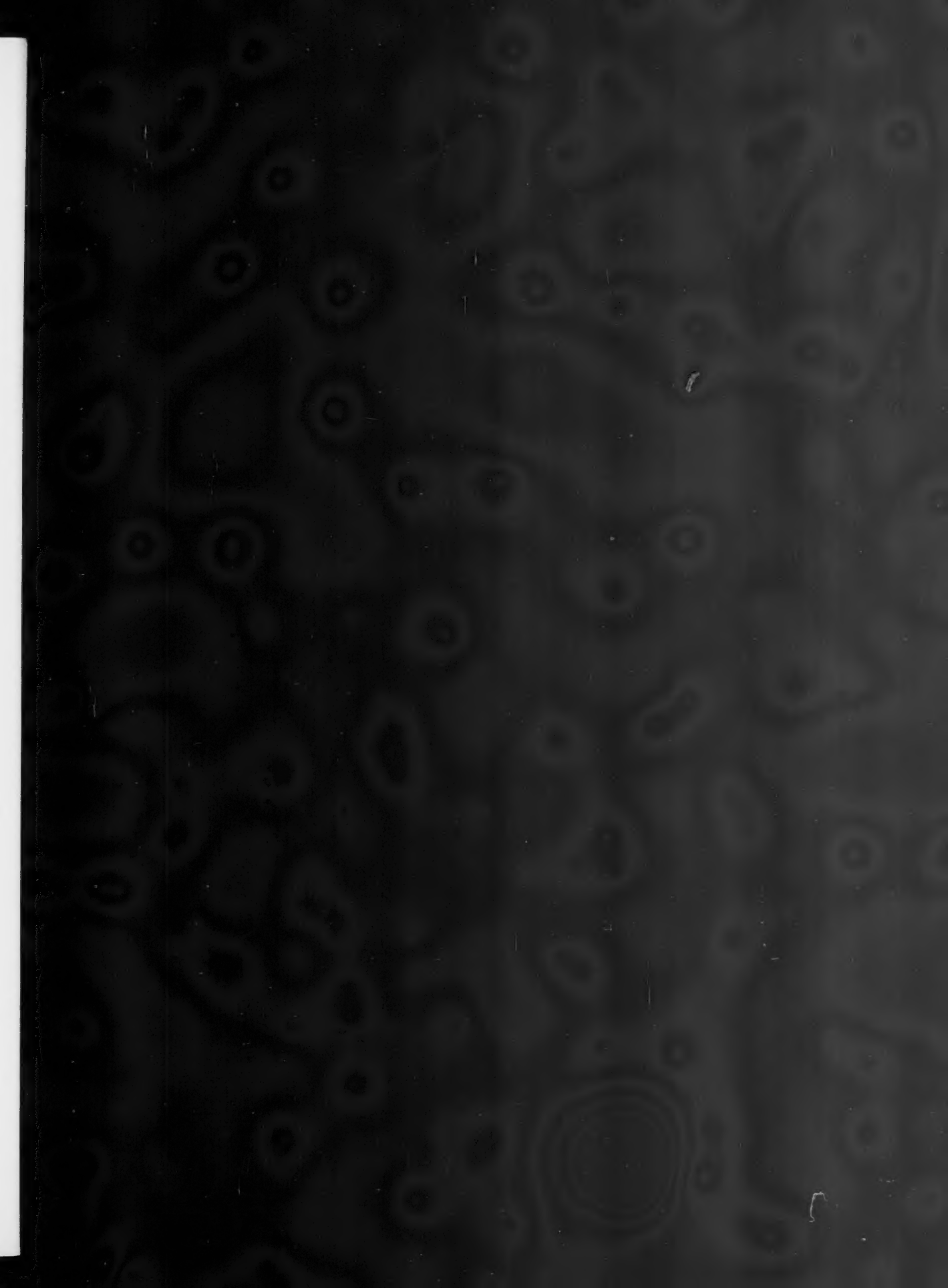
| | |
|---|---|
| A | ampere(s) |
| A.C. | air-cooled |
| a.c. | alternating current |
| A.H. | air-hardened |
| approx. | approximately |
| A.S.T.M. | grain size number (American Society for Testing Materials) |
| at-% | atomic percent |
| a.w.g. | American wire gauge |
| b.c.c. | body-centred cubic |
| °Bé | Baumé (degree) |
| B. & S. | Brown and Sharpe (gauge) |
| B.o.T. | Board of Trade |
| b.w.g. | Birmingham wire gauge |
| c.g.s. | Centigrade-gramme-second unit(s) |
| $cm^3$ | cubic centimetre(s) |
| D.P.N. | Vickers diamond pyramid hardness number |
| F.C. | furnace-cooled |
| f.c.c. | face-centred cubic |
| h.c.p. | hexagonal close-packed |
| h.f. | high-frequency |
| h.p.-h | horsepower-hour(s) |
| i.s.w.g. | Imperial standard wire gauge |
| kX | crystal Ångstrom(s) = 1000 Siegbahn X-units |
| l.f. | low-frequency |
| O.H. | open-hearth; oil-hardened |
| O.Q. | oil-quenched |
| p.p.m. | parts per million |
| R.T. | room temperature |
| s | second(s) |
| s.w.g. | standard wire gauge |
| T. | tempered |
| °Tw | degree(s) Twaddell |
| w.g. | water-gauge |
| W.Q. | water-quenched |
| wt-% | weight percent |

# *Corrigenda*

Mr. T. Henry Turner wishes to point out that in the **Discussion at the Corrosion Meeting** (*J. Iron Steel Inst.*, 1957, May, vol. 186, p. 94), he said that the Atmospheric Corrodibility Index was put forward by the S.C.I. Corrosion Group; in fact, the index was discussed many times by the Atmospheric Corrosion Sub-Committee of B.I.S.R.A.

In the paper on **"Tonnage Oxygen"** by F. J. Clark and J. L. Harrison (*J. Iron Steel Inst.*, 1957, July, vol. 186, pp. 305–323), the following errors were made on p. 323:

1. The price of caustic soda is quoted as £2 per ton; this should be £2 per cwt.
2. In Fig. 9 the cost of production should be in pence per 1000 $ft^3$ and not per 10,000 $ft^3$.



## Dr.-Ing. Dr.mont.h.c. ROBERT DURRER

ROBERT DURRER was born in Switzerland in 1890. He studied ferrous metallurgy at the Technische Hochschule, Aachen, obtaining the degrees of Diplom-Ingenieur in 1914, and Doktor-Ingenieur in 1915.

Shortly after the end of the first World War, after several years of industrial practice, when the installation of a smelting plant was being considered in Switzerland, he studied the possibilities of electric smelting. In this connection, he undertook a visit to Scandinavia with a Swiss commission and subsequently spent some time at a Swedish iron and steelworks. Convinced that the iron-smelting technique of the day would need to be modified in the future, as a result of changes in quality and availability of raw materials, Dr. Durrer made a special study of iron and steel production methods, especially the so-called ' direct ' processes.

In 1929, Dr. Durrer was appointed Director of the Institut für Eisenhüttenkunde an der Technischen Hochschule (now the Technische Universität), Berlin-Charlottenburg. In the following years he worked in close contact with industry, in order both to direct research into the most useful channels and to ensure that the results would be speedily applied. Some of the results of the research work carried out under his guidance have been published in the *Carnegie Scholarship Memoirs of The Iron and Steel Institute*.

During the last war he returned to his own country and founded the Lehrstuhl für Metallurgie an der Eidgenössischen Technischen Hochschule, Zürich. At the same time he was appointed Managing Director of the Gesellschaft der Ludw. von Roll'schen Eisenwerke A.G., Gerlafingen.

Dr. Durrer has been responsible for many publications, of which the best known are perhaps " Die Metallurgie des Eisens," " Erzeugung von Eisen und Stahl," " Grundlagen der Eisengewinnung," and " Verhütten von Eisenerzen." For almost thirty years he has been concerned with the problem of producing iron with the aid of oxygen, as he was convinced that in this way ironmaking processes could be improved.

Dr. Durrer became a Member of The Iron and Steel Institute in 1929 and was elected an Honorary Vice-President in 1947. In 1952, he became Dr.mont.h.c. of the Montanistische Hochschule, Leoben, and Senator h.c. of the Technische Universität, Berlin-Charlottenburg. In 1955, he was appointed an Honorary Member of the Instituto del Hierro y del Acero, Madrid, and was awarded the first Peter Tunner Medal of the Montanistische Hochschule, Leoben. In 1956 he was elected an honorary member of the Verband Schweizerischer Eisengiessereien, Zürich. He was awarded the Bessemer Gold Medal of The Iron and Steel Institute in 1957 in recognition of his distinguished contribution to the development of iron and steelmaking processes, and especially his pioneer work in the fields of electric steelmaking and the use of oxygen.

**Dr. Robert Durrer**

*Bessemer Gold Medallist*, 1957